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EXAMINER	
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4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/040,226	FEE ET AL.	
	Examiner	Art Unit	
	Christina Y. Leung	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-104* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *53-59* is/are allowed.

6)☒ Claim(s) *1-30,35,36,38-52,60-97,102 and 103* is/are rejected.

7)☒ Claim(s) *31-34,37,98-101 and 104* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 38 is objected to because of the following informalities:

Claim 38 recites "directing the optical switch to couple the first port to the second port" in line 7 of the claim. Although Examiner generally understands the claim limitation, Examiner notes that "a second port" is not recited until line 8 of the claim and respectfully suggests that Applicants amend the claim so that "a second port" is properly recited prior to line 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 85, 86, 89, and 90 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 85 and 86 each recite "the second supplemental signal detecting means" in lines 3-4 and 4-5 of the claims, respectively. There is insufficient antecedent basis for these limitations in the claims, since claim 83 on which they depend only recites "a supplemental signal detecting means coupled to a second optical line" but does not explicitly recite two detecting means.

Similarly, claims 89 and 90 also each recite "the second supplemental signal detecting means" in lines 3-4 and 4-5 of the claims, respectively. There is insufficient antecedent basis for these limitations in the claims, since claim 88 on which they depend only recites "a supplemental

signal detecting means coupled to a second optical line" but does not explicitly recite two detecting means.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 16-19, 38-43, 45, 46, 60-64, 66-69, and 82-86 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerstel et al. (US 5,867,289 A).

Regarding claim 1, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port (Figure 2 shows how the switching elements 204 receive inputs and direct them to output ports), the optical switch further comprising:

a supplemental signal detector 210 coupled to the second optical signal port for detecting a supplemental signal associated with the optical signal (column 3, lines 37-42; column 4, lines 6-39).

Regarding claim 2, Gerstel et al. disclose that the optical switch receives information about at least one attribute of the detected supplemental signal from the supplemental signal detector 210 and issues a fault indication if the attribute does not meet an expected criterion (Figure 10, step 1005 in particular; column 4, lines 35-39; column 6, lines 30-43).

Regarding claim 16, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injector (including driver 201 and light source 202) coupled to the first optical signal port for adding a supplemental signal associated with the optical signal (column 4, lines 15-33).

Regarding claim 17, Gerstel et al. disclose that the switch includes a supplemental signal detector (wavemeter 210) coupled to the second signal port for detecting the supplemental signal associated with the optical signal.

Regarding claim 18, Gerstel et al. disclose that the supplemental signal detector determines information about at least one attribute of the detected supplemental signal and the optical switch issues a fault indication based upon whether the attribute meets and expected criterion (column 4, lines 34-44; column 5, lines 12-34; column 7, lines 9-11).

Regarding claim 19, Gerstel et al. disclose that the optical switch determines the value of at least one attribute of the supplemental signal injected by the supplemental signal injector and receives information about the value of the attribute detected in the supplemental signal from the supplemental signal detector 210 and issues a fault indication based upon whether the value of the attribute detected by the supplemental signal detector agrees with the value of the attribute imparted by supplemental signal injector (column 7, lines 9-11). Gerstel et al. disclose that the switch has a determined expected value associated with the supplemental signal injected and

received by the switch, and the system determines whether the value detected by detector 210 agrees with the expected value.

Regarding claim 38, Gerstel et al. disclose in an optical network (Figures 2) comprising at least one optical switch 204, a method for verifying optical signal routing comprising the steps of:

providing in the network at least one optical signal having at least one attribute of known value (via incoming line 106)

directing the network to route the optical signal to a first port of the optical switch;

directing the optical switch to couple the first port to the second port;

at a second port of the optical switch, sensing the attribute of the optical signal and determining a detected value for the attribute (using wavemeter 210);

comparing the detected value of the attribute to the known value of the attribute (using comparator 646); and

determining whether the optical signal is being routed correctly based at least upon whether the detected value agrees with the known value (column 5, lines 12-34; column 7, lines 9-11).

Regarding claim 39, Gerstel et al. disclose that the attribute of known value relates to at least one supplemental signal (from associated with the optical signal and the detector determines the detected value of the attribute by detecting the supplemental signal (column 5, lines 12-34; column 7, lines 9-11).

Regarding claim 40, Gerstel et al. disclose, in an optical network comprising at least one optical switch (Figure 2), a method for verifying optical signal routing comprising the steps of:

providing at least one optical signal at a first port of the optical switch (via incoming 106), the optical signal having at least one attribute of known value;

at a second port of the optical switch, sensing the attribute of the optical signal and determining a detected value for the attribute (using wavemeter 210);

comparing the detected value to the known value (column 7, lines 9-11); and

determining whether the first port is optically coupled to the second port based upon whether the detected value agrees with the known value (column 7, lines 9-11).

Regarding claim 45, Gerstel et al. disclose that the providing the optical signal is accomplished by providing the optical signal in the network and directing the signal through the network to the first port of the optical switch. Again, element 202 injects the signal to an optical line that is ultimately associated with a first port in switch 204.

Regarding claims 41 and 46, Gerstel et al. disclose that the attribute of known value relates to a supplemental signal associated with the optical signal and the detector determines the detected value of the attribute by detecting the supplemental signal (column 5, lines 12-34; column 7, lines 9-11).

Regarding claim 42, Gerstel et al. disclose that the supplemental signal becomes associated with the optical signal substantially near the first port (Figure 2 shows that the injector elements 201 and 202 are near the first port of the switch 204).

Regarding claim 43, Gerstel et al. disclose that the providing of the at least one optical signal at the first port of the optical switch is accomplished by coupling a supplemental signal injector (including driver 201 and light source 202) to an optical line associated with the first port.

Regarding claim 60, Gerstel et al. disclose in an optical network comprising at least one optical switch (Figure 2), a method for determining optical path integrity, comprising the steps of:

providing, to a first port of the optical switch, at least one optical signal having associated therewith at least one supplemental signal (using driver 201 and light source 202);

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port, detecting the supplemental signal and determining a first detected value for at least one attribute of the supplemental signal (using wavemeter 210);

at the second port, detecting the supplemental signal and determining a second detected value for the attribute of the supplemental signal, wherein the second detected value is determined at a different time than the first detected value (again using wavemeter 210); and

determining whether the carrying of the optical signal in the network has varied based at least upon comparison of the first detected value to the second detected value.

Gerstel et al. disclose that the supplemental signal may be detected and examined continuously during the operation of the switch (column 6, lines 44-55). It would be well understood that they disclose that the user would determine that the carrying of the optical signal in the network has varied based at least upon comparison of the first detected value to the second detected value (i.e., if a second detected value indicated an error, while the earlier first detected value did not, a user would determine that an error had occurred since the detecting of the first value, and that the carrying of the signal had "varied").

Regarding claim 61, Gerstel et al. disclose in an optical network comprising at least one optical switch (Figure 2), a method for determining optical path integrity, comprising the steps

of:

providing, to a first port of the optical switch, at least one optical signal having associated therewith at least one supplemental signal having at least one attribute (using driver 201 and light source 202);

establishing a first value for the attribute applicable to the optical signal upon entry to the first port (the driver 201 sets a first value for the supplemental signal that is predetermined by users as desired);

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port, detecting the supplemental signal and determining a second value for the attribute (using wavemeter 210);

at a first instant in time, computing a first difference value between the first value and the second value;

determining optical path integrity based upon the first difference value.

Gerstel et al. disclose that the second value is compared to a predetermined threshold that is necessarily based on the original first value and determines optical path integrity based upon this comparison (i.e., "difference value"; column 7, lines 3-19).

Regarding claim 62, Gerstel et al. disclose that the attribute is related to amplitude (i.e., the power level of the signal or whether or not the signal is present).

Regarding claims 63 and 64, Gerstel et al. disclose that the attribute is also "related" to wavelength or the frequency of the supplemental signal, in that the supplemental signal is specifically a different wavelength/frequency from the regular optical data signals, and Gerstel et al. disclose detecting the presence or absence of that particular wavelength as part of

determining the optical path integrity (column 7, lines 3-19).

Regarding claim 66, Gerstel et al. disclose that the first value is established by providing a supplemental signal wherein the first value is accurately set to a specific value (column 4, lines 15-34).

Regarding claim 67, Gerstel et al. disclose, at a second instant in time distinct from the first instant in time, determining a second difference value in the same manner as the determining of the first difference value; and determining optical path integrity based at least upon comparison among the first and second difference values. As similarly discussed above with regard to claim 60, Gerstel et al. disclose that the supplemental signal may be detected and examined continuously during the operation of the switch (column 6, lines 44-55). It would be well understood that they disclose that the user would determine optical path integrity based at least upon comparison of the first difference value to the second difference value (i.e., if a second difference value indicated an error, while the earlier first difference value did not, a user would determine that an error had occurred since the first difference value was determined, and that the status of the system had changed).

Regarding claim 68, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching means 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

at least one supplemental signal detecting means 210 coupled to the second optical signal port for detecting at least one supplemental signal associated with the optical signal and

determining a value of at least one attribute of the supplemental signal (column 5, lines 12-34; column 7, lines 9-11).

Regarding claim 69, Gerstel et al. disclose attribute evaluating means (column 5, lines 12-34; column 7, lines 9-11) for determining whether the value of the attribute meets at least one criterion; and fault indicating means for issuing a fault indication based upon whether the value of the attribute meets the criterion (not explicitly shown in Figure 2, but Gerstel et al. disclose that an alarm or fault indication may be produced; column 7, lines 9-11).

Regarding claim 82, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching means 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injecting means (including driver 201 and light source 202) coupled to an optical line associated with the first optical signal port for adding a supplemental signal associated with the optical signal (column 4, lines 15-33).

Regarding claim 83, Gerstel et al. disclose that the switch includes a supplemental signal detecting means (wavemeter 210) coupled to a second optical line associated with the second signal port for detecting the supplemental signal associated with the optical signal.

Regarding claim 84, Gerstel et al. disclose means (wavemeter 210) for determining the value of at least one attribute of the detected supplemental signal from the supplemental signal detecting means; and

fault indicating means for issuing a fault indication based at least upon whether the value

of the attribute does not meet at least one criterion (not explicitly shown, but Gerstel et al. disclose that an alarm or fault indication may be produced; column 7, lines 9-11).

Regarding claim 85, Gerstel et al. disclose comparing means for comparing the supplemental signal as injected by the supplemental signal injecting means to the supplemental signal as detected by the supplemental signal detecting means (column 7, lines 9-11); and

fault indicating means coupled to the comparing means for issuing a fault indication based at least upon whether the detected supplemental signal is substantially consistent with the injected supplemental signal (column 7, lines 9-11).

Regarding claim 86, Gerstel et al. disclose comparing means for comparing a first value of at least one attribute of the supplemental signal (i.e., the expected/original value) as injected by the supplemental signal injecting means to a second value of at least one attribute of the supplemental signal (i.e., the actual received value) as detected by the supplemental signal detecting means (column 7, lines 9-11); and

fault indicating means coupled to the comparing means for issuing a fault indication based at least upon whether the detected supplemental signal is substantially consistent with the injected supplemental signal (column 7, lines 9-11).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 3 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al.

Regarding claims 3 and 70, Gerstel et al. disclose a system as discussed above with regard to claims 1 and 2, or 68 and 69, respectively, including issuing a fault indication based on a criterion. Gerstel et al. do not explicitly disclose that the criterion is affected by information from a source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist before the system issues a fault indication in the manner disclosed by Gerstel et al. It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system disclosed by Gerstel et al. is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

8. Claims 20-26, 49-52, and 87-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al. in view of Fee (US 6,108,113 A).

Regarding claims 20 and 87, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injector/injecting means 201 coupled to the first optical signal port

for adding a supplemental signal associated with the optical signal.

Gerstel et al. does not specifically disclose that the optical signal has an associated other (i.e., first) supplemental signal originating outside of the optical switch.

However, Fee teaches that a signal in an optical network may include an associated supplemental signal (Figure 9 shows how ancillary data 905 can be introduced as a first supplemental signal to an optical signal). Fee further discloses that this first supplemental signal may be used to provide many different types of supplemental information as desired (column 13, lines 29-60). Regarding claims 20 and 87, it would have been obvious to a person of ordinary skill in the art to include a first supplemental signal as taught by Fee in the system disclosed by Gerstel et al. in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch (as disclosed by Gerstel et al.).

Regarding claims 21 and 88, Gerstel et al. disclose a supplemental signal detector/detecting means 210 coupled to the second signal port for detecting at least one of the supplemental signals associated with the optical signal.

Regarding claims 22, 89, and 90, Gerstel et al. disclose that the optical switch determines the value of at least one attribute of the second supplemental signal injected by the supplemental signal injector (column 4, lines 35-39) and receives information from the supplemental signal detector about the value of the attribute detected in the second supplemental signal and issues a fault indication based upon whether the value of the detected attribute value agrees with the value of the attribute imparted by supplemental signal injector (i.e., the expected value of the attribute; column 6, lines 30-43; column 7, lines 3-18). Regarding claims 89 and 90 in particular,

it would be well understood that Gerstel disclose means for perform the above functions, i.e., comparing means for determining whether the detected and expected values agree and fault indication means.

Regarding claim 23, Gerstel et al. disclose detecting a supplemental signal and issuing a fault indication if it does not meet an expected criterion, but again, they do not specifically disclose two supplemental signals. However, again Fee teaches including a supplemental signal for carrying additional information, and Fee further teaches detecting this signal and issuing a fault indication or warning based on it if necessary (column 14, lines 13-19). It would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

Regarding claims 24 and 91, it would have been obvious to a person of ordinary skill in the art to ensure that the supplemental signals were different from each so that they could be separately used for providing different information. Also, Fee teaches that the first supplemental signal may be provided as a subcarrier signal, while Gerstel et al. disclose injecting a second supplemental signal having a different wavelength from the main signal, and it would be well understood that the two methods would create signals distinguishable from each other.

Regarding claims 25 and 92, again, Gerstel et al. disclose a supplemental signal detector, but they do not specifically disclose a first supplemental signal other than the one injected by the injector 201, and therefore, they do not specifically disclose detecting such a signal. However, Fee further teaches a first supplemental signal and teaches detecting it and causing a fault

indication to be issued depending on whether the first supplemental signal meets an expected criterion, using fault indicating means (column 14, lines 13-19). Regarding claim 25 and 92, it would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

Regarding claims 26 and 93, Gerstel et al. disclose that the detector detects the second supplemental signal (the one injected by injector 201) and causes a fault indication to be issued depending on whether the second supplemental signal meets an expected criterion, using fault indicating means (column 6, lines 30-43; column 7, lines 3-18).

Regarding claim 49, Gerstel et al. disclose in an optical network comprising at least one optical switch (Figure 2), a method for verifying optical path integrity comprising the steps of:

providing within the network at least one optical signal (via incoming line 106);

directing the network to route the optical signal to a first port of the optical switch (switch 204);

at a point before the optical signal enters a first port, adding a supplemental signal associated with the optical signal (using elements 201 and 202);;

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port of the optical switch, detecting a supplemental signal (using wavemeter 210); and

responsive to the detection of a supplemental signal, determining optical path integrity in the optical network (column 5, lines 12-34).

Gerstel et al. do not specifically disclose that the at least one optical signal has associated therewith at least one first supplemental signal other than the supplemental signal that is added at a point before the signal enters a first port. However, again, Fee teaches that a signal in an optical network may include an associated supplemental signal (Figure 9 shows how ancillary data 905 can be introduced as a first supplemental signal to an optical signal). Fee further discloses that this first supplemental signal may be used to provide many different types of supplemental information as desired (column 13, lines 29-60). It would have been obvious to a person of ordinary skill in the art to include a first supplemental signal as taught by Fee in the system disclosed by Gerstel et al. in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch (as disclosed by Gerstel et al.).

Regarding claim 50, it would have been obvious to a person of ordinary skill in the art to ensure that the supplemental signals were different from each so that they could be separately used for providing different information. Also, Fee teaches that the first supplemental signal may be provided as a subcarrier signal, while Gerstel et al. disclose injecting a second supplemental signal having a different wavelength from the main signal, and it would be well understood that the two methods would create signals distinguishable from each other.

Regarding claim 52, Gerstel et al. disclose establishing a first value of at least one attribute of the second supplemental signal;

at the second port, selectively detecting the second supplemental signal and determining a second value of attributes; and

determining whether the optical signal is correctly routed based upon whether the first

value agrees with the second value.

In other words, Gerstel et al. disclose establishing a first, expected value for the second supplemental signal, detecting the signal at the second port and determining the "actual" detected value, and determining whether the optical signal is correctly routed based upon whether the expected value agrees with the second value (column 7, lines 9-11).

Regarding claim 51 in particular, Gerstel et al. disclose a supplemental signal detector, but they do not specifically disclose a first supplemental signal other than the one injected by the injector 201, and therefore, they do not specifically disclose detecting such a signal. However, Fee further teaches a first supplemental signal and teaches detecting it and causing a fault indication to be issued depending on whether the detected value of the first supplemental signal agrees with an established expected value (column 14, lines 13-19). It would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

9. Claims 4-15, 47, 48, 65, and 71-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al. in view of Shiragaki (US 5,457,556 A).

Regarding claims 6 and 73, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal detector/detecting means (wavemeter 210) coupled to the second optical signal port for detecting a supplemental signal associated with the optical signal.

Gerstel et al. do not specifically disclose another (i.e., "first") supplemental signal detector/detecting means coupled to the first optical signal port for detecting a supplemental signal associated with the optical signal.

However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector in the system disclosed by Gerstel et al. as taught by Shiragaki in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claims 7 and 74, Gerstel et al. disclose a supplemental signal detector 210 (i.e., a means for determining) that determines information about at least one attribute of the detected supplemental signal and the optical switch issues a fault indication if the attribute does not meet an expected criterion (i.e., they disclose fault indicating means; column 7, lines 3-19) but do not specifically having a first such detector coupled to the first port. Again, Shiragaki teaches detecting signals at the first port of a similar optical switch. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector in the system disclosed by Gerstel et al. as taught by Shiragaki in order to provide further fault detection in the system.

Regarding claim 9, Gerstel et al. disclose that the optical switch receives information

about at least one attribute of the detected supplemental signals from the (second) supplemental signal detector 210, and issues a fault indication based at least upon whether the information about the attribute detected in the supplemental signal agrees with the predetermined information about the attribute based on the originally transmitted supplemental signal (column 7, lines 3-19).

Regarding claim 12 in particular, Gerstel et al. disclose that the supplemental signal detector determines an amplitude value of the signal, compares it to a predetermined original amplitude value, and calculates a loss value based on the difference between these values (column 7, lines 3-19).

Regarding claims 9 and 12, Gerstel et al. disclose having a predetermined first value and do not specifically disclose detecting the supplemental signal in a first supplemental signal detector before the signal enters the first port of the switch, but Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a first supplemental detector such as suggested by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Gerstel et al., particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 10, Gerstel et al. disclose that the optical switch receives information about at least one attribute of the detected supplemental signals from a supplemental signal

detector (wavemeter 210) and issues a fault indication if the attribute for this supplemental signal does not meet an expected criterion (column 7, lines 3-19). Again, Gerstel et al. do not specifically disclose a first such supplemental signal detectors coupled to the first port of the switch. However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. Again, it would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector in the system disclosed by Gerstel et al. as taught by Shiragaki in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claim 13, Gerstel et al. discloses that the optical switch issues a fault indication when the loss value exceeds a criterion (column 7, lines 3-19).

Regarding claims 76 and 77, Gerstel et al. disclose comparing means for comparing a first sampling or value of at least one attribute of the supplemental signal (a predetermined first value, established based on the originally transmitted signal) to a second sampling/value detected at a supplemental signal detector 210 and further disclose fault indicating means for issuing a fault indication based upon whether the samplings/values are consistent (column 7, lines 3-19).

Regarding claim 78, Gerstel et al. disclose that the supplemental signal detecting means 210 determines an amplitude value of the signal and disclose establishing a first amplitude value of the signal. They further disclose a loss determining means which determines a loss value by calculating a difference between the first amplitude value and the second amplitude value (column 7, lines 3-19). Again, they do not specifically disclose that a first supplemental detecting

means determines the first amplitude value of the supplemental signal.

Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a first supplemental detector such as suggested by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Gerstel et al., particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 79, Gerstel et al. disclose fault indicating means coupled to the loss determining means for issuing a fault indication based at least upon the loss value meets a criterion (column7 , lines 3-19).

Regarding claims 14 and 80, Gerstel et al. disclose that the criterion is based upon previous values of the loss value, since they disclose that the supplemental signal may be detected and examined continuously during the operation of the switch (column 6, lines 44-55). It would be well understood that they disclose that the user would determine that the carrying of the optical signal in the network has varied based at least upon comparison of the first loss value to the second loss value (i.e., if a second loss value indicated an error, while the earlier first loss value did not, a user would determine that an error had occurred since the determination of the first value had occurred).

Regarding claims 8, 11, and 15, Gerstel et al. in view of Shiragaki suggest a system as

discussed above with regard to claims 6, 7, and 10-14 above, including issuing a fault indication based on a criterion. Similarly, regarding claims 75 and 81, Gerstel et al. in view of Shiragaki suggest a system as discussed above with regard to claims 73, 74, 78 and 79. Gerstel et al. do not explicitly disclose that the criterion is affected by information from a source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist before the system issues a fault indication in the manner disclosed by Gerstel et al.

It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system suggested by Gerstel et al. in view of Shiragaki is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

Regarding claim 47, Gerstel et al. disclose in an optical network comprising at least one optical switch (Figure 2), a method for verifying optical signal routing comprising the steps of:

providing in the network at least one optical signal having at least one detectable attribute (using driver 201 and light source 202);

determining a first value corresponding to the detectable attribute at the first port of the optical switch (the predetermined threshold based on the originally transmitted supplemental signal; column 7, lines 3-19);

at the second port of the optical switch, detecting the detectable attribute and determining

a second detected value for the detectable attribute (using wavemeter 210);

determining whether the first port is optically coupled to the second port based upon whether the first detected value agrees with the second detected value (column 7, lines 3-19).

Regarding claim 48 in particular, Gerstel et al. disclose that the detectable attribute relates to a supplemental signal associated with the optical signal and discloses detecting the supplemental signal, albeit only at the second port of the switch.

Again, Gerstel et al. do not specifically additionally detecting the detectable attribute and determining a first detected value for the detectable attribute at the first port of the switch, but Shiragaki et al. teach detecting values of a signal on both sides of an optical switch (Figure 2). It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector in the system disclosed by Gerstel et al. as taught by Shiragaki in order to provide further fault detection in the system and more thorough information to users about attributes of the signal at various locations.It also would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a detector such as taught by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Gerstel et al., particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 65, Gerstel et al. disclose a method in an optical network as discussed above with regard to claim 61. However, Gerstel et al. do not specifically disclose that the first value is established by detecting the supplemental signal and determining the first value by measurement.

Similarly, regarding claims 4 and 71, Gerstel et al. disclose a system as discussed above with regard to claims 1 and 2, or 68 and 69, and they further disclose determining whether the value of the attribute of the supplemental signal meets at least one criterion based upon a predetermined value of the attribute (i.e., the originally transmitted value). However they do not disclose that the value of the attribute may be specifically previously detected.

Again, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector in the system disclosed by Gerstel et al. as taught by Shiragaki in order to provide further fault detection in the system and more thorough information to users about attributes of the signal at various locations.

Further regarding claims 4, 65, and 71, it would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a detector such as taught by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Gerstel et al., particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claims 5 and 72, Gerstel et al. disclose that the attribute is an amplitude level related to the supplemental signal (column 7, lines 3-19).

10. Claims 27-30, 44, and 94-97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al. in view of Fatehi et al. (US 5,892,606 A).

Regarding claims 27 and 94, Gerstel et al. disclose an optical switch facilitating the verification of optical path integrity (Figure 2), comprising a plurality of optical signal ports and an optical switching matrix 204 (i.e., an optical switching means) for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, wherein the optical signal has an associated first supplemental signal originating outside of the optical switch (from driver 201 and light source 202).

Gerstel et al. do not specifically disclose supplemental signal modifying means or an injector, coupled to a first optical line associated with the first optical signal port, for changing the first supplemental signal into a second supplemental signal associated with the optical signal.

However, Fatehi et al. disclose that signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. in the system disclosed by Gerstel et al. for modifying the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the system as desired.

Regarding claims 28 and 95, Gerstel et al. disclose a supplemental signal detector/detecting means (wavemeter 210) coupled to the second signal port for detecting at least one supplemental signal associated with the optical signal.

Regarding claims 29 and 96, Gerstel et al. disclose that the supplemental signal detector detects the supplemental signal and disclose fault indicating means for issuing a fault indication depending at least upon whether the signal meets an expected criterion (column 7, lines 3-19).

Regarding claim 30, Gerstel et al. disclose that the optical switch determines the value of

at least one attribute of the supplemental signal as it enters the first port of the switch and receives information from the supplemental signal detector 210 about the value of the attribute detected in the supplemental signal and issues a matrix fault indication depending at least upon whether the detected value of the attribute agrees with the value originally imparted to the first port of the switch (column 7, lines 3-19).

Similarly, regarding claim 97, Gerstel et al. disclose comparing means for comparing a first value for at least one attribute of the supplemental signal as it enters the first port of the switch to a second value of the attribute as detected by the supplemental signal detecting means 210; and fault indicating means coupled to the comparing means for issuing a fault indication based at least upon whether the second value is substantially consistent with the first value (column 7, lines 3-19).

Regarding both claims 30 and 97, Gerstel et al. do not specifically disclose that the first value of the attribute is determined by a supplemental signal modifying means prior to entering the first port of the switch, but again Fatehi et al. disclose that signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. in the system disclosed by Gerstel et al. for modifying the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the system as desired. In the system thus suggested by Gerstel et al. in view of Fatehi et al, the signal entering the first port of the switch would be modified, and the detector (wavemeter 210) disclosed by Gerstel et al. would therefore operate by comparing the detected value with the

modified value entering the switch in order to properly determine any changes in the signal as it passes through the switch.

Regarding claim 44, Gerstel et al. discloses a system as discussed above with regard to claims 40 and 41, but they do not specifically disclose by modifying the supplemental signal associated with the optical signal near the first port. However, Fatehi et al. disclose that signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. near the first port of the switch in the system disclosed by Gerstel et al. in order to modify the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the switch as desired.

11. Claims 35, 36, 102, and 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al. in view of Fatehi et al. as applied to claims 27 and 94, respectively, above, and further in view of Shiragaki.

Regarding claims 35 and 102, Gerstel et al. in view of Fatehi et al. suggest a system as discussed above with regard to claims 27 and 94 above, respectively, including detecting an attribute of the supplemental signal and issuing a fault indication depending upon whether the attribute meets an expected criterion (Gerstel et al., column 7, lines 3-19). They do not specifically suggest that the first supplemental signal may be detected at the supplemental signal modifier/modifying means (i.e., before entering the first port of the switch). However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Gerstel et al., and further including detecting means (fault detector 26) coupled to the first and second optical

signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector at the first port of the switch such as suggested by Shiragaki in the system suggested by Gerstel et al. in view of Fatehi in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claims 36 and 103 Gerstel et al. do not explicitly disclose that the criterion is affected by information from a source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist before the system issues a fault indication in the manner disclosed by Gerstel et al. It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system disclosed by Gerstel et al. is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

Allowable Subject Matter

12. Claims 53-59 are allowed.

13. Claims 31-34, 37, 98-101, and 104 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach or fairly suggest a system with the limitations recited in claims 31-34, 37, 53-59, 98-101, and 104 (including the limitations of the claims on which they may depend).

Although Gerstel et al. generally disclose an optical switch including a supplemental signal injector and detector for determining faults in the system as discussed above, and although Fatehi et al. generally disclose modifying an incoming signal as desired by a user, they do not specifically suggest a system with the limitations recited in claims 31-34, 37, 53-59, 98-101, and 104 (including the limitations of the claims on which they may depend), particularly wherein the first supplemental signal is modified or associated with a second supplemental signal and the optical switch infers at least one attribute of the first supplemental signal by detection of the second supplemental signal.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

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